age (first of the five subdivisions of the Tertiary) in Colorado, Utah, and Wyoming.

These rocks consist of varves, not glacial but biochemical in origin. Each varve consist of two laminœ, one of ooze that has lithified into oil shale, the other of calcium and magnesium carbonate such as is now being deposited as marl in many lakes. From analogy with modern lake deposits it is argued that the carbonates were precipitated in early summer, the oil shale later in the hottest season, and that these sediments were still more sharply separated by differential settling. Study of the sandstone layers suggests that the climate was marked by a well-defined winter rainy season, and examination of plant remains indicates temperatures and rainfalls similar in amount to those now prevalent in Louisiana.

In addition to the bilaminal annual cycle, recurrent groups of thick varves show an average interval of a little less than 12 years, with individual intervals ranging from 7 to about 18 years.

An average cycle of 21,630 years resulted from measurements on four groups of alternating beds of oil shale and marlstone, affording 16 cycles. Croll's hypothesis, it will be remembered, was based on a cycle of about 21,000 years, the resultant of the cycle of the precession of the equinoxes in 25,000 or 26,000 years, and the revolution of the line of apsides, in the opposite direction.

A third cycle, of about 50 years, is represented by regularly recurrent layers of calcite-filled cavities that are supposed to have originally been filled with a salt-like glauberite. This corresponds to no well-established rhythm.

Climatologists will envy Bradley his wealth of material. From measurements of varves he estimates the Green River epoch to have lasted between five and eight million years.—*Eric R. Miller.*

Padua, Italy, precipitation, 1900–1928.—A correspondent asks us to print the continuation of the Padua record of annual precipitation that was given in the article by Robert E. Horton on "Group distribution and periodicity of annual rainfall amounts, this REVIEW, 51: 514–521. This we do in the following table:

Total annual precipitation (millimeters) [1]

1901	1,029.7	1915	943.3
1902	851.1	1916	1,131.9
1903	800.3	1917	742.1
1904	794.2	1918	971.1
1905	1,140.5	1919	875.5
1906	818.5	1920	910.1
1907	714.4	1921	429.6
1908	566.0	1922	691.7
1909	715.1	1923	752.6
1910	1,075.4	1924	878.4
1911	906.6	1925	728.1
1912	762.1	1926	741.2
1913	860.4	1927	798.1
1914	773.1	1928	835.6

Meteorological summary for Chile, February, 1930 (by J. Bustos Navarrete, Observatorio del Salto, Santiago, Chile).—The weak atmospheric circulation over the Pacific and the scantiness of rain noted in January continued during this month. In the first decade depressions of minor importance crossed the extreme southern region and were accompanied by scattered rains between Magallanes and Valdivia, with maximum amounts on the 3d and 4th. Thereafter the weather was settled in high degree over the entire country. Two anticyclones of major importance were charted as follows: 17th–18th, moving from Chiloe toward Argentina, and 25th–28th, moving from Magallanes northward.—*Translated by W. W. R.*

[1] Record by months in Sitzungsberichte der kaiserlichen Akademie der Wissenschaften. III. Abt. IIa. 1902.

BIBLIOGRAPHY

C. FITZHUGH TALMAN, in Charge of Library

RECENT ADDITIONS

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

Alexander, William H., & Patton, Charles A.
Climate of Ohio. Wooster. n. d. 69 p. figs. 23 cm. (Ohio agric. exper. sta., Bull. 445, December, 1929.)

American national red cross.
Mississippi Valley flood disaster of 1927. Washington. [1929.] vii, 152 p. figs. plates. 23 cm.

Berlin. Flugwetterdienst.
Flugwetterdienst und Luftverkehr. [Beeskow i. M.] n. d. 18 p. figs. 23 cm.

Byers, Horace R.
Summer sea fogs of the central California coast. Berkeley. 1930. p. 291–338. figs. plates (fold.) 27½ cm. (Univ. Cal. pub. geogr., v. 3, no. 5.)

Daniel Guggenheim fund for the promotion of aeronautics, inc.
Solving the problem of fog flying. A record of the activities of the fund's full flight laboratory to date. New York City. n. d. 152 p. 22 cm.

Ficker, H. v.
Der Sturm in Norddeutschland am 4. Juli, 1928. Berlin. 1929. 39 p. figs. 26 cm. (Sonderausg. Sitzungsber. der preuss. Akad. der Wissensch. phys.-math. Kl. 1929. XXII.)

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Areas covered by intense and widespread falls of rain. Westminster. 1929. 32 p. figs. 22 cm. (Exc.: Minutes of proc. Inst. civil engin., v. 229, sess. 1929–30, pt. 1.)

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Jarvis, C. S.
Rainfall characteristics and their relation to soils and run-off. p. 3–47. figs. 22½ cm. (Amer. soc. civil engin., Proc. January, 1930.)

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New England flood of November, 1927. Washington. 1929. iv, p. 45–100. figs. plates. 23½ cm. (U. S. Geol. survey, water-supply paper 636–C.)

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Thermoelectric radiometer for ecological use on land and in water. p. 103–113. figs. 24½ cm. (Repr. Ecology, v. 11, no. 1, January, 1930.) (Prof. paper no. 14, Boyce Thompson inst. for plant research, inc.)

Tsiang, P. J.
La température de Tsingtao. 1929. iii, 69 p. plates (fold.) 25 cm.